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**Markwart et al.**(10) **Pub. No.: US 2014/0307701 A1**(43) **Pub. Date: Oct. 16, 2014**(54) **COORDINATED SPECTRUM ALLOCATION  
AND DE-ALLOCATION TO MINIMIZE  
SPECTRUM FRAGMENTATION IN A  
COGNITIVE RADIO NETWORK****Publication Classification**(51) **Int. Cl.**  
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USPC ..... **370/329**(75) Inventors: **Christian Markwart**, Munich (DE);  
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An apparatus and a method are described, by which a fragmentation probability is determined which indicates a probability of fragmentation of frequency resources in at least one network section for at least one network operating entity. Moreover, an apparatus and a method are described, by which frequency resources in at least one network section are allocated and/or de-allocated, priorities of frequency resources are defined for at least one network operating entity individually, and allocating and/or de-allocating of the frequency resources for the at least one network operating entity is performed based on the priorities. For allocating and/or de-allocating of the frequency resources, also the fragmentation probability may be taken into account.

